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Chemical Weed Control in Sorghum 1979

COOPERATIVE EXTENSION SERVICE
SOUTH DAKOTA STATE UNIVERSITY
U.S. DEPARTMENT OF AGRICULTURE

Chemical Weed Control in Sorghum 1979

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A good rotation, proper seedbed preparation, timely cultivation and herbicides are useful weed control practices in sorghum.

The crop grows slowly the first few weeks after emerging. Weed control is essential during this period; yields can be reduced by 25% and more.

Sorghum planted in narrow rows is more competitive with weeds than sorghum in wide rows. Forage types can become very competitive, especially when planted "solid" or in close-drilled rows. Still, serious weed problems can occur in solid plantings if weeds are not controlled with a harrow, rotary hoe, or herbicide.

The amount and distribution of rainfall and seasonal temperatures affect weed growth and density. Some years, annual weeds can be controlled with a rotary hoe or flextine harrow. In other years, you may need to use a row crop cultivator.

Most annual grassy weeds are less serious if the crop is planted after mid-June. There will be more trouble with broadleaved annual weeds and late-season grasses such as sandbur in late planted sorghum.

Perennial weeds are difficult to control adequately with cultivation. Herbicides, crop rotations, and more intensive cultivations are useful in reducing and eradicating these weeds.

Cultivation for Weed Control

Proper tillage immediately before planting kills emerged weeds and prevents weeds from getting a head start on the crop.

After planting, you can choose from several different cultivation systems. A rotary hoe or flextine harrow is useful to control emerging weeds when the crop is small. If you planted in conventional row spacings, you can use a row crop cultivator. Sorghum planted in furrows or with lister-type planters is usually cultivated twice with equipment designed especially for this purpose.

Rotary Hoe. Use the rotary hoe at a speed of 8 to 10 miles per hour. It is most effective if used before small weed seedlings develop green color, and if the soil is crusted. Hoeing during the heat of the day reduces breakage if crop plants are large.

Two hoeings can be done for about the same cost as the first row cultivation.

Flextine Harrow. Operate a flextine harrow at 2 miles per hour or less. It is most effective on weed seedlings less than ¼ inch high. Some sorghum seedlings may be destroyed if the seed is planted shallow. Some sorghum growers prefer to use the flextine harrow after the first row cultivation.

Three harrowings can be made for about the same cost as the first row cultivation.

Herbicides for Weed Control

Herbicides can aid in controlling weeds in sorghum, but are not intended as replacements for sound management.

Granules vs Spray Formulations. Some herbicides are in spray or granular formulations. Granules are easier to handle when band treating. However, they usually cost slightly more per pound of active ingredient than spray formulations.

Follow The Label

Federal regulations make it unlawful for any person to use an herbicide in a manner inconsistent with its labeling. This includes the kind of crop and weed; rate, carrier and other application directions; storage, disposal and protective clothing; or other precautions stated.

Broadcast vs Band Application. Band applications reduce the cost per acre for chemical. They provide early-season weed control and reduce yield losses that occur during the first 3 to 4 weeks after planting. Use a band that is 12 to 14 inches wide for surface-planted sorghum.

Herbicides are usually applied in a 7-inch band instead of broadcast on furrow or lister-planted sorghum. Use special nozzles that apply the herbicide uniformly behind the press wheel of the planter.

Preplant-incorporated herbicides usually are not banded because suitable equipment is generally not available to incorporate the herbicide properly in the row ahead of the planter.

For band application, determine the amount needed for the area actually treated. For example, if the broadcast rate of 3 lb/A of product is applied in 12-inch bands to 36-inch rows, only a third of the area is actually treated as the field is crossed, and only one-third of the 3 lb/A rate is needed. Therefore, 1 pound of product is all that is needed to band spray each acre. (See Fact Sheet 342, "Checking Weed Sprayers.")

Irrigated Sorghum. Herbicide results and treatment suggestions are based on dryland tests. Unless the field is irrigated soon after planting, early season weed control is similar to non-irrigated crops. Irrigation can stimulate weed growth, especially of late season weeds. Therefore, herbicides that have greater residual effect will improve season-long weed control.

In furrow-irrigated sorghum, the herbicide layer is usually disturbed when furrows are made, resulting in considerable weed growth.

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Table 1 Weed Control Rating and Crop Tolerance Sorghum Herbicides

Table 1 gives a general rating of weed control and crop tolerance with recommended rates used under field conditions. The ratings are based on plot data and other observations. Weed control and crop tolerance vary with soil and weather conditions, the rate used and other factors. For some weeds, special rates listed on the label must be used to get indicated results.

A weed control rating of "1" is assigned those treatments giving the best control of the weed. Perennial control refers to top-growth suppression. Crop tolerance refers to visual effects; these do not necessarily cause a yield reduction.

	Broadleaved Weeds										Grassy Weeds					
	Sunflower	Velvetleaf	Cocklebur	Wild buckwheat	Smartweed	Kochia	Mustard	Lambsquarters	Pigweed	C. thistle, F. bindweed	Barnyardgrass	Foxtails	Sandbur	Panicum	Wild Oats	Crop tolerance
Preplant incorporated																
AAtrex/Atrazine	1	1	1	1	1	1	1	1	1	5	2	2	3	4	3	F
Milogard	1	2	2	1	1	1	1	1	1	5	2	2	3	4	3	G
Preemergence																
AAtrex/AAtrazine	1	2	2	1	1	1	1	1	1	5	3	3	3	4	3	F
Ramrod, Bexton, Propachlor	5	5	5	4	4	5	5	4	3	5	2	1	3	1	4	E
Ramrod + Atrazine	2	3	2	1	1	1	1	1	1	5	2	1	3	1	4	G
Ramrod + Bladex	2	4	3	1	1	2	1	1	2	5	2	1	3	1	3	G
Ramrod + Linuron	3	3	3	1	1	2	1	1	2	5	2	1	3	2	3	G
Post-emergence																
AAtrex/Atrazine+oil	1	1	1	1	1	2	1	1	1	4	3	2	3	5	3	F
2,4-D	1	2	1	2	3	3	1	1	2	2	5	5	5	5	5	F
Banvel	2	4	2	1	1	2	2	1	2	2	5	5	5	5	5	P

Weed ratings: 1=Good; 2=Fair; 3=Marginal; 4=Poor; 5=None.
Crop tolerance: E=Excellent; G=Good; F=Fair; P=Poor.

SORGHUM HERBICIDES

Weeds	Common name	Rate lb/A Actual* Broadcast	Product/A - Trade name-Formulation Broadcast	Time to Spray and Remarks
Numerous annual broadleaved; some annual grasses	propazine	2-2½	*2½-3 lb Milogard-80% wp*	Preplant. Grain and forage sorghum. Shallow incorporation (1-2 inches deep) reduces rainfall requirement. Do not use on sandy or very heavy clay soils. Carryover will damage small grain and legume/grass seedings the following year.
Numerous annual broadleaved and annual grasses	atrazine	1⅔-2½	*2-3 lb AAtrex, Atrazine-80% wp* *or* *1⅔-2½ qt AAtrex, Atrazine-4#/gal* *or* *1.8-2¾ lb AAtrex Nine-0-90% wdg*	Preplant or preemergence. Grain and forage sorghum, sorghum-sudan crosses. Shallow incorporation (1-1½ inch deep) reduces rainfall requirement. Do not use on sands. Risk of crop injury, especially under cold, wet conditions. Carryover will damage soybeans, small grains and grass/legume seedings the following year. Reduced carryover with low-rate post-emergence applications with crop oil fits more situations.
Numerous annual grasses	propachlor	4-6	*6-9 lb Ramrod, Propachlor-65% wp* *or* *20-30 lb Ramrod, Bexton, Propachlor-20% gran* *or* *4-6 qt Bexton-4 #/gal*	Preemergence. Grain sorghum. Must have ⅓ to ¾ inch of rain within 1 week after application. The low rate is for light, sandy soil. Spray and granules appear equally effective. Granular formulation less irritating to handle. Calibrate equipment for each granular product. No carryover. Do not graze or feed forage to dairy cattle.
Numerous annual grasses and annual broadleaved	propachlor + atrazine	2½-4 + 1-1½	*3¾-6 lb Ramrod, Propachlor-65% wp* *or* *2½-4 qt Bexton-4 #/gal* + *1⅓-2 lb AAtrex, Atrazine-80% wp* *or* *1-1½ qt AAtrex, Atrazine-4#/gal*	Preemergence. Grain sorghum. Tank mix or use commercial premix. Must have ½-¾ inch of rain within 1 week after application. Use the high rate for heavy, clay soil and in high rainfall areas. Rates in tank mix can be adjusted to fit the weed problem. Do not use on sandy soil. Carryover will damage small grain and legume/grass seedings the following year. Do not graze or feed forage to dairy cattle.
			5-8 lb Ramrod/atrazine-48+20% wp	
Numerous annual broadleaved and annual grasses	propachlor + cyanazine	2⅓-4 + 1-1½	*3⅔-6 lb Ramrod, Propachlor-65% wp* + *1¼-2 lb Bladex-80% wp*	Preemergence. Grain sorghum. Tank mix. Must have ½ to ¾ inch of rain within 1 week after application. The low rates are for light sandy soil and the high rates for heavy, clay soil or in high rainfall areas. Pigweed may not be controlled. No carryover.
Numerous annual broadleaved; few annual grasses	bifenox	1½-2	*2-2½ lb Modown-80% wp*	Preemergence. Grain sorghum. Must have ⅓ to ¾ inch of rain within 1 week after application. Bifenox is more effective on broadleaved weeds. Good pigweed control. The tank-mix with *Ramrod* provides broad spectrum weed control. No carryover.
Numerous annual broadleaved and annual grasses	propachlor + bifenox	2⅔-3 + 1½	*4-4½ lb Ramrod-65% wp* + *2 lb Modown-80% wp*	
Numerous annual broadleaved and annual grasses	atrazine + crop oil	1¼ + crop oil	*1½ lb AAtrex, Atrazine-80% wp* *or* *1¼ qt AAtrex, Atrazine-4#/gal* + *crop oil*	Post-emergence. Grain and forage sorghum, sorghum-sudan crosses. After sorghum reaches 3-leaf stage but before boot stage. Most effective on small weeds. Annual broadleaved weed control better than grasses. Check crop oil label for rate. Regular crop oil is suggested at 1 gal/A for ground and ½ gal/A for aerial application. Do not use on sandy soil. Crop injury has occurred in unusually cool, wet seasons. Carryover minimized but may damage small grain and grass/legume seedings the following year. Rates of 2-3 lb/A active can be applied post-emergence without crop oil. These rates will control a broader spectrum of weeds but is more dependent on rainfall and increases carryover problems.

Broadleaved	2,4-D ester	¼	–	*Numerous*	Post-emergence. Grain sorghum. Apply when plants are 4-12 inches tall. Determine height by measuring from ground to where new leaf is emerging. Maximum rates shown seldom cause severe injury. Spraying plants under stress conditions increases risk of injury. Considerable variation in product labels.
	2,4-D amine	½	–	*Numerous*	
	2,4-D	1	–	*Numerous*	After heading for perennials. Use high clearance sprayer. Check product label.

OTHER SORGHUM HERBICIDES

Numerous annual grasses and annual broadleaved	propachlor + linuron	⅔-3 + ⅓-1½	*1-4¾ lb Ramrod-65% wp* + *⅔-3 lb Lorox-50% wp*	Preemergence. Grain sorghum. Tank mix. Must have ½ to ¾ inch of rain within 1 week after application. The lower rates are for light, sandy soil and the higher rates for heavy, clay soil. Rates of 3 (propachlor) plus 1 (linuron) lb/A active have been satisfactory for susceptible weeds in most SDSU tests. Do not use on sandy soil. No carryover. Do not graze or feed forage to dairy cattle.
Several annual grasses and broadleaved	terbutryn	1½-2½	*2-3 lb Igran-80% wp*	Preemergence. Grain sorghum. Marginal crop tolerance. Greater risk of injury under some conditions. Apply immediately after planting. Do not irrigate from emergence to 2-inch height. Do not use on sandy soil. Winter wheat may be planted 4 months after application.
	terbutryn + atrazine	1½-2 + .8	*2-2½ lb Igran-80% wp* + *1 lb AAtrex-80% wp*	Preemergence. Tank mix. Reduced injury risk and greater carryover than for terbutryn alone. Note precautions for terbutryn alone.
Broadleaved	dicamba	¼	*½ pt Banvel-4#/gal*	Post-emergence. Grain sorghum. Apply 10-25 days after crop emergence. Some varieties appear to be less tolerant. Crop tolerance appears to be marginal. Injury can be expected from applications later than suggested. Follow drift precautions.

* Acid equivalent or active ingredient.

Table 2 Amount of Chemical For Weeds

Table 2:

The amount of 2,4-D usually required to control several weeds at different growth stages is listed. The same amount of chemical is less effective as the weed matures. Control may vary due to growing conditions and formulation. The rates shown are not included on the labels of all formulations or products. Refer to the product label and the recommendations for sorghum.

¼ lb/A	⅓ lb/A	½ lb/A	¾ - 1 lb/A
	Kochia, 1-2 in.	Kochia, 2-4 in.	Canada thistle
Marsh elder, 2-4 in.	Marsh elder, over 4 in.		Field bindweed
Ragweeds, 2-4 in.	Ragweeds, over 4 in.		Perennial sowthistle
Pigweeds, 2-4 in.	Pigweeds, over 4 in.		Hoary cress
Mustard, 4-6 in.	Mustard, over 6 in.		Leafy spurge
Lambsquarters, 4-6 in.	Lambsquarters, over 6 in.		Russian knapweed
	Cocklebur, 2-6 in.	Cocklebur, over 6 in.	
	Sunflower, 2-6 in.	Sunflower, over 6 in.	
	Lady's thumb, 2-6 in.	Lady's thumb, over 6 in.	
	Velvetleaf, 4-6 in.	Velvetleaf, over 6 in.	
	Russian thistle, 2-4 in.	Russian thistle, 4-6 in.	
	Wild buckwheat, 2 leaves		

Minimum Tillage. Reduced tillage systems usually leave more plant residue on the surface. This residue may distort the herbicide pattern on the soil or intercept some of the chemical. Overall weed control will be less. Devices to remove residue from the row area will reduce this problem for preemergence band applications.

Combinations and Mixtures. Combinations of herbicides capitalize on the good points of several herbicides while minimizing weak points. You can purchase the herbicides separately and tank-mix them in the sprayer, or some may be purchased in one container as a commercial pre-mix. Tank mixtures allow more flexibility in selecting the rate of each herbicide to be used. Mix only those herbicides that are labeled for use together.

Some herbicides are labeled for application in liquid fertilizer carrier. Check the product label for mixing directions. Usually, wettable powder or flowable formulations should be pre-mixed with fertilizer or water before adding to the spray tank. Emulsifiable concentrates are added last. Agitation is required. It is advisable to test mix a small quantity of the products before filling the sprayer.

Herbicide Suggestions

Information in this publication is based on research by the South Dakota Agricultural Experiment Station and other research or observations. Herbicides are included only after the chemical is registered by the Environmental Protection Agency (EPA) as to residue tolerances in crops used for food or feed.

This fact sheet is a summary of herbicide uses and does not imply a guarantee or responsibility for results. You need the following information to secure maximum benefits.

1. **Weed problem.** Weeds are classified as broadleaved weeds (includes the more common weeds such as lambsquarters, pigweed, and kochia) and weedy grasses (includes green and yellow foxtail). A few special weeds are listed individually. Herbicide performance on specific weed species is given in Table 1.

2. **Chemicals.** Herbicide uses are based on the actual chemical (acid equivalent or active ingredient) in each herbicide product. The common and trade name of most chemicals are listed. Product formulation is listed with the trade name. Trade names for chemicals such as 2,4-D are too numerous to list. The label for specific products may vary as to crop, rate, application directions, etc. Crop tolerance to several herbicides is shown in Table 1.

The treatments listed under "Sorghum Herbicides" are those considered to be most promising for the range of weed problems and conditions in South Dakota. "Other Sorghum Herbicides" may be useful for special weed problems, have experimental label, or are useful within limitations.

3. **Rates.** The amount of actual chemical per acre for broadcast application is listed in one column and the amount of product per acre is listed with the trade name and formulation in another column. The amount of product, trade name and formulation are not listed for chemicals having numerous trade names.

The range in rates includes most minimum and maximum amounts listed on the product label. The rate for soil applied herbicides varies according to soil texture, soil organic matter and weed species. Post-emergence herbicide rates are based on the kind and size of the weed, growing conditions and formulation used. Additional comments about rates used in South Dakota field tests are included in the remarks column. It is important to read the product label for complete information on rate to use for that product. The amount of 2,4-D usually required to control several weeds at different growth stages is shown in Table 2.

4. **Time to apply.** Time to spray is given for all chemicals with respect to the crop unless otherwise stated.

Preplant—treatments made before the crop is planted and, in most cases, the treatments are incorporated with a disk. The rainfall requirement is usually less critical and the seasonal variation in performance is usually less with preplant than with preemergence applied herbicides.

Preemergence—treatments made after planting, but before emergence of the crop and weeds. Weed control is usually better if tillage operations for seedbed preparation are performed immediately before planting and if the herbicide is applied immediately after planting. For best results, the soil should be free of large lumps and heavy amounts of plant residue. These treatments require moisture within 1 week after application to move the chemical into the soil so it can be taken up by roots and shoots. More moisture is required if the soil is dry than if it is moist. A shallow cultivation with a rotary hoe or flextine harrow is suggested if weeds emerge before adequate moisture is received. Preemergence herbicides are not effective if the area is disturbed by deep cultivation.

Post-emergence—treatments applied after the crop and weeds have emerged. Weeds should be controlled as early as possible to prevent yield losses due to early season weed competition. The most desirable time to spray the crop and weed is usually short.

5. **Remarks.** Performance and application information is included. Crop use limitations of most importance are included. These are subject to change and may not be the same on all product labels.

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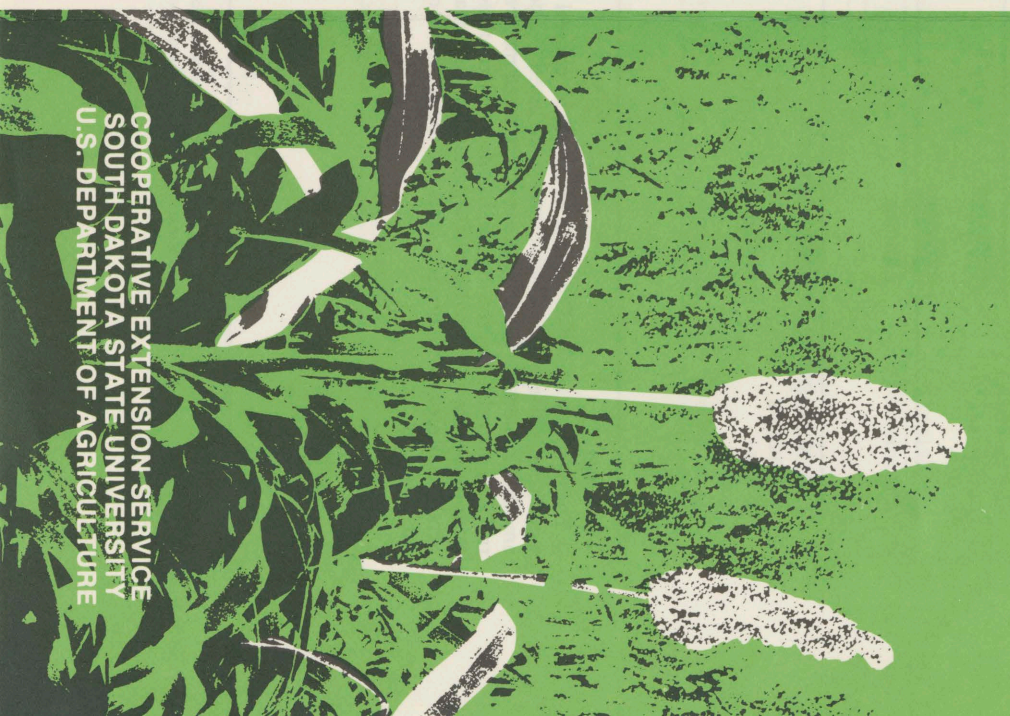

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